

WHAT IS CLAIMED IS:

1. A method for fabricating a monolithic inkjet printhead on a die having a first surface, an opposite second surface, and an edge surface extending from the first surface to the second surface, the printhead having a plurality of printing elements, the method comprising the steps of:
  - 5 forming a first layer on the first surface of the die;
  - defining a pattern in the first layer delimiting a first area for an ink feed channel, along with a membrane area within the first area, the membrane area defining openings for ink fill channels, the defined pattern leaving an exposed portion of the first surface;
  - 10 depositing at least one conductive layer onto at least a portion of the first layer to define a plurality of firing resistors and wiring lines, said at least one conductive layer deposited to a side of the first layer opposite from the die, wherein said at least one conductive layer does not physically contact the die;
  - 15 depositing at least one passivation layer overlaying the first layer and at least one conductive layer without overlaying the exposed portion of the die's first surface;
  - etching a feed channel through the exposed portion of the die's first surface;
  - 20 applying a filler material to occupy the feed channel and the defined openings in the membrane;
  - planarizing exposed areas of the filler material;
  - after the step of planarizing, forming an orifice layer overlaying the passivation layer and feed channel, the orifice layer defining a plurality of nozzle chambers, each one of the plurality of nozzle chambers aligned with at least one of the plurality of firing resistors; and
  - 25 removing the filler material within the feed channel and defined openings in the membrane, wherein the defined openings serve as fill channels connecting nozzle chambers to the feed channel; and
  - 30 wherein each one of the plurality of printing elements comprises a firing resistor and nozzle chamber and a fill channel, the fill channel extending from the nozzle chamber to the feed channel, and wherein for each one of the plurality of printing elements a respective wiring line is conductively coupled to the firing resistor of said one printing element.

2. The method of claim 1, wherein the step of forming an orifice layer comprises:
  - for each one firing resistor applying a sacrificial mandrel over said one firing resistor;
  - applying an orifice layer around the sacrificial mandrels;
  - removing the sacrificial mandrel material to form respective inkjet nozzle chambers and nozzle openings;
3. The method of claim 4, in which the passivation layer and the array of firing resistors and wiring lines are part of a thin film structure residing between the die and the orifice layer.
4. A method for fabricating a monolithic inkjet printhead on a die having a first surface, an opposite second surface, and an edge surface extending from the first surface to the second surface, the printhead having a plurality of printing elements, the method comprising the steps of:
  - applying a first passivation layer to the first surface of the die, wherein a portion of the die's first surface remains exposed;
  - applying an array of firing resistors and wiring lines to the first passivation layer;
  - etching a feed channel through the exposed portions of the die's first surface;
  - applying a filler material to occupy the feed channel;
  - planarizing exposed areas of the filler material;
  - after the step of applying a filler material, forming an orifice layer overlaying the first passivation layer and the array of firing resistors and wiring lines, the orifice layer defining a plurality of nozzle chambers, each one of the plurality of nozzle chambers aligned with at least one of the plurality of firing resistors; and
  - removing the filler material from the feed channel; and
  - wherein each one of the plurality of printing elements comprises a firing resistor and nozzle chamber and a fill channel, the fill channel extending from the nozzle chamber to the feed channel, and wherein for each one of the plurality of printing

elements a respective wiring line is conductively coupled to the firing resistor of said one printing element.

- 5 5. A monolithic inkjet printhead having a plurality of printing elements, the printhead comprising:
  - a die having a first surface, an opposite second surface, and an edge surface extending from the first surface to the second surface, wherein the first surface defines a recessed area, the recessed area extending along the first surface from an edge surface inward away from the edge surface, the recessed area serving as a feed channel that channels ink toward at least a multiple of printing elements of said plurality of printing elements, and wherein said feed channel does not extend to said second surface;
  - a plurality of first layers overlaying the first surface of the die, wherein the plurality first layers are patterned to define a plurality of firing resistors, wiring lines and ink fill channels;
  - a second layer overlaying the plurality of first layers, wherein the second layer has a pattern defining a plurality of nozzle chambers, each one of the plurality of nozzle chambers aligned over at least one firing resistor of the plurality of firing resistors, each one of the plurality of nozzle chambers having a nozzle opening;
  - wherein each one of the plurality of printing elements comprises a firing resistor and nozzle chamber and a fill channel, the fill channel extending from the nozzle chamber to the feed channel, and wherein for each one of the plurality of printing elements a respective wiring line is conductively coupled to the firing resistor of said one printing element.

- 25 6. An inkjet pen, comprising:
  - a pen body defining an internal reservoir for storing ink;
  - a monolithic inkjet printhead having a plurality of printing elements, the printhead comprising:
- 30 a die having a first surface, an opposite second surface, and an edge surface extending from the first surface to the second surface, wherein the first surface defines a recessed area, the recessed area extending along the first surface from an edge surface inward away from the edge surface, the recessed area serving as a feed channel that channels ink toward at least a multiple of printing elements of said plurality

of printing elements, and wherein said feed channel does not extend to said second surface;

5 a plurality of first layers overlaying the first surface of the die, wherein the plurality first layers are patterned to define a plurality of firing resistors, wiring lines and ink fill channels; and

10 a second layer overlaying the plurality of first layers, wherein the second layer has a pattern defining a plurality of nozzle chambers, each one of the plurality of nozzle chambers aligned over at least one firing resistor of the plurality of firing resistors, each one of the plurality of nozzle chambers having a nozzle opening; and

15 wherein each one of the plurality of printing elements comprises a firing resistor and nozzle chamber and a fill channel, the fill channel extending from the nozzle chamber to the feed channel, and wherein for each one of the plurality of printing elements a respective wiring line is conductively coupled to the firing resistor of said one printing element.